BAYLY ENGINEERING LIMITED

Communication Systems and Components

AEG TELEFUNKEN

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INSTRUCTION MANUAL

RF ABSORPTION WATTMETER
TYPES AW1-60, AW1-80,
AW1-101 & AW1-151

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SECTION 1

1.0 GENERAL

1.01 The Type AW1 Absorption Wattmeter is designed to measure and absorb the output of an RF generator in a 50-ohm coaxial system.

1.02 The wattmeter combines the functions of a non-radiating dummy antenna and a direct-reading RF wattmeter.

2.0 DESCRIPTION

2.01 The wattmeter consists of a 50-ohm film type resistor mounted in a special coaxial matching system. The load thus presents a low VSWR over a wide frequency range. The resistive element is convection cooled by an oil dielectric medium which conducts the heat to the finned radiator where it is dissipated in the air.

2.02 The power measuring section consists of a dual-range, wide-band voltage divider coupled to an RF voltmeter. Since the system presents a low VSWR termination, the indicator can be calibrated directly in watts.

2.03 The indicator can be separated from the load section for convenience in meter reading. The meter is a ruggedized, hermetically sealed instrument designed for field use.

3.0 TECHNICAL SUMMARY

Power Rating:	150 Watts, maximum		
Power Ranges:	AW1-60	0-15/0-60	Watts
dual, full scale	AW1-80	0-20/0-80	Watts
	AW1-101	0-25/0-100	Watts
	AW1-151	0-30/0-150	Watts
VSWR:	1.1 max. to 500 MHz		
Accuracy:	± 5% of full scale (100 to 500 MHz)		
Frequency:	30 to 500 MHz		
Input Connector:	N female		
Operating Position:	Horizontal, portable		
Dielectric Coolant:	Volt Esso 35		
Cooling Method:	Convection, aluminum radiator		
Finish:	Grey semi-gloss baking enamel		
Dimensions:	6.5 in.h., 4.0 in.w., 12.0 in.l.		
Weight:	7.0 lbs.		

4.0 SPARE CRYSTAL

4.01 The spare crystal may be used in place of the installed one. Both crystals have been selected and matched for operation with this instrument. Note that only one crystal should be inserted in the block at one time. Crystals are not interchangeable between voltmeters without recalibration. The spare crystal is stored in a holder inside the meter box.

5.0 POWER CALIBRATION VS FREQUENCY

5.01 Frequency errors between 100 and 500 MHz are within the specified accuracy and no frequency correction is required.

5.02 Below 100 MHz, a correction should be applied, 1.05 at 50 MHz, 1.10 at 30 MHz.

5.03 Above 500 MHz, usable readings can be obtained to 1000 MHz. A correction of 1.10 at 600 MHz is required, 1.20 at 800 MHz, 1.30 at 1000 MHz. For more accurate results, the specific factor for this instrument could be obtained by calibration against a standard meter at the operating frequency.

SECTION 3

MAINTENANCE

1.0 GENERAL

1.01 The circuit simplicity and mechanical design of the wattmeter result in a minimum of field maintenance. Except for replacement of a defective crystal with the spare one provided, no attempt at corrective maintenance should be undertaken in the field.

1.02 All jacks and crystal plugs should be kept clean. The diode and dummy plug should be kept in their jacks at all times.

1.03 Do not separate the crystals from the voltmeter. The working crystal should be retained by the chain provided. If the spare crystal is to be used, attach it to the chain.

2.0 CRYSTAL REPLACEMENT

2.01 The crystal diodes, Type 1N21B, contained in their mounting plugs, are selected to match the meter scale and to track the same scale. Should both crystals become defective, new matched crystals should be used. Recalibration of the wattmeter may be necessary, although it may be used with the knowledge that an error of 20% may be present.

3.0 CALIBRATION

3.01 The wattmeter should be checked at intervals to determine the accuracy of calibration.

3.02 To check the calibration, an accurate inline wattmeter or coupler and calorimetric power meter should be used. A Narda Type 3040-10 Coupler (10dB, 240 to 500 MHz) and Hewlett Packard Type 434A Calorimetric Power Meter are suggested.

3.03 Check the load resistance with a D.C. bridge. The resistor should be 50 ohms ± 2%.

3.04 Apply RF power to the wattmeter through the inline standard. Set the power level to full scale and check the corresponding readings.

3.05 Check the readings using the spare crystal. If the readings are the same, but not within 5% of the standard, adjust the screw on the side of the voltmeter block nearest the crystal jack until the meter under test agrees with the standard.

3.06 If one crystal differs from the other by more than 2%, reject one crystal unit. Both crystals should give nearly identical readings.

3.07 Insert the crystals in the other range jack and if necessary adjust the calibration screw until the readings agree within 5%.

3.08 If possible, the frequency calibration should be checked across the operational band of the wattmeter.

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